IN THE CLAIMS

1. (previously presented) An apparatus for determining a property of a fluid downhole comprising:
   (a) a resonator in contact with the fluid downhole;
   (b) a controller that actuates the resonator; and
   (c) a processor that estimates the property of the fluid using a response of the resonator to the actuation.

2. (previously presented)The apparatus of claim 1, wherein the processor uses a chemometric equation for estimating the property.

3. canceled

4. (previously presented)The apparatus of claim 2 wherein the processor correlates a measured resonator response with known fluid property values.

5. (previously presented) The apparatus of claim 1, wherein the property is viscosity.

6. (previously presented) The apparatus of claim 1, wherein the property is density.

7. (previously presented) The apparatus of claim 1, wherein the property is dielectric constant.

8. (previously presented) The apparatus of claim 1, wherein the property is resistivity.

9. (previously presented) The apparatus of claim 2, wherein the processor applies the chemometric estimated property to a Levenberg-Marquardt (LM) algorithm to determine a fluid parameter value for the fluid.

10. (original) The downhole tool of claim 10, wherein the fluid parameter value comprises a global minimum for the LM algorithm.

11. (currently amended) A method for determining a property of a fluid downhole, the method comprising:

(a) positioning a resonator adjacent to the downhole fluid;

(b) actuating the resonator;

(c) measuring a response of the resonator to the actuation; and

(d) estimating a value of the property of the fluid downhole based on the measured response while the fluid is one of (i) being pumped, and (ii) static.

12. (previously presented)The method of claim 11, further comprising:

estimating the fluid property using a chemometric equation.

13. canceled

14. (previously presented) The method of claim 12, further comprising: correlating the response with known fluid property values.

15. (previously presented)The method of claim 11, wherein the property is viscosity.

16. (previously presented)The method of claim 11, wherein the property is density.

17. (previously presented)The method of claim 11, wherein the property is dielectric constant.

18. (previously presented)The method of claim 11, wherein the property is resistivity

19. (previously presented)The method of claim 12, further comprising: applying the chemometric estimated parameter value to a Levenberg-Marquardt (LM) algorithm to determine a fluid parameter value for the fluid.

20. (previously presented)The method of claim 19, wherein the fluid parameter value comprises a global minimum for the LM algorithm.

21-30 (cancelled)

31. (previously presented) A system for determining the properties of a downhole fluid, the system comprising:

(a) a surface controller that lowers a tool deployed in a well bore formed in an adjacent formation, the tool interacting with a down hole fluid;

(b) a resonator in contact with the downhole fluid;

(c) a controller that actuates the resonator; and

(d) a processor that estimates a value of a property for the downhole fluid using a response of the resonator.

32. (currently amended) The system of ~~claim 3~~ claim 31,:

wherein the processor uses a chemometric equation for estimating a fluid the property value.

33. (previously presented) The system of claim 32, wherein the processor applies a function applying the resonator response to a the chemometric equation to determine a the fluid property value.

34. (previously presented) The system of claim 31,wherein the processor uses a function for deriving a chemometric equation from measured resonator response correlated with known fluid property values.

35. (previously presented) The system of claim 31, wherein the parameter value property is viscosity.

36. (previously presented) The system of claim 31, wherein the parameter value property is density.

37. (previously presented)The system of claim 31, wherein the parameter value property is dielectric constant.

38. (previously presented)The system of claim 31, wherein the parameter value property is resistivity.

39. (previously presented) The system of claim 12, wherein the processor applies the chemometric estimated parameter value property to a Levenberg-Marquardt (LM) algorithm to determine a fluid parameter value for the fluid.

40. (previously presented) The system of claim 39, wherein the fluid parameter value comprises a global minimum for the LM algorithm.

41. (previously presented) The apparatus of claim 1 wherein the resonator comprises a mechanical resonator.

42. (previously presented) The apparatus of claim 1 wherein the resonator comprises a tuning fork.

43. (new) An apparatus for determining a property of a fluid downhole comprising:

(a) a resonator in direct contact with the fluid downhole;

(b) a controller that actuates the resonator; and

(c) a processor that estimates the property of the fluid using a response of the resonator to the actuation.